

REMARKS

By this Amendment, claims 1, 5-6, 8, 10, 13 and 17, and the Abstract of the Disclosure are amended. Support for the amendments to the claims may be found, for example, in FIGS. 3-4 and their corresponding descriptions. No new matter is added. After entry of this Amendment, claims 1-20 will remain pending in the patent application. Reconsideration and allowance of the present patent application based on the foregoing amendments and following remarks are respectfully requested.

In the Office Action, the Abstract of the Disclosure was objected to. In response, a new Abstract is submitted herewith that fully complies with the guidelines set forth in MPEP §608.01(b). Accordingly, reconsideration and withdrawal of the objection to the Abstract of the Disclosure are respectfully requested.

In the Office Action, claim 5 was objected to. In response, claim 5 is amended to change the recitation "said mirror elements" to "said redirecting elements". It is respectfully submitted that the amendment to claim 5 overcomes the objection. Accordingly, reconsideration and withdrawal of the objection of claim 5 are respectfully requested.

Claims 10, 11 and 13-15 were rejected under 35 U.S.C. §102(b) based on Shinoda (U.S. Pub. No. 2002/0001134). The rejection is respectfully traversed.

Claim 10 is patentable over Shinoda at least because this claim recites a device manufacturing method comprising, *inter alia*, directing the beam of radiation through a plurality of redirecting elements to an illumination system, the directing being performed such that polarization-related radiation losses are reduced and such that the predetermined polarization state relative to each of said redirecting elements is maintained. Shinoda does not teach or suggest a method including these features. Therefore, Shinoda does not teach or suggest each and every feature recited by claim 10 and, as a result, cannot anticipate claim 10.

Shinoda discloses an optical system including an internal reflection type optical member effective to change a direction of advancement of an approximately linearly polarized light on the basis of total reflection, and a depolarizing member for dissolving linear polarization of light emitted from the optical member. (*See* FIG. 1). Shinoda is, however, silent about, for example, directing the beam of radiation such that the predetermined polarization state relative to each of the redirecting elements is maintained. To the contrary, Shinoda discloses that the polarization state changes relative to each of the

redirecting elements depending on the type of redirecting elements. Shinoda teaches, for example, that “the internal reflection type optical element (deflection optical elements 12 and 13) is used for deflection of P-polarized light” and “for deflection of S-polarized light, the dielectric film mirror (deflection optical elements 11 and 14) is used.” (See paragraph [0047] and FIG. 1). Therefore, Shinoda cannot anticipate claim 10.

Claim 11 is patentable over Shinoda at least by virtue of its dependency from claim 10 and for the additional features recited therein.

Claim 13 is patentable over Shinoda for at least similar reasons as provided in claim 10 and for the additional features recited therein. Namely, claim 13 is patentable over Shinoda at least because this claim recites a beam delivery subsystem for use with a lithographic apparatus comprising a plurality of redirecting elements to redirect a beam of radiation having a predetermined polarization state from a radiation source to an illumination system of the lithographic apparatus, the redirecting elements being arranged to provide a minimum polarization related radiation loss, wherein the beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of said redirecting elements. Shinoda does not teach or suggest a beam delivery system including these features. In particular, Shinoda does not teach or suggest that the predetermined polarization states relative to each of the redirecting elements are maintained. Therefore, Shinoda cannot anticipate claim 13.

Claims 14-15 are patentable over Shinoda at least by virtue of their dependency from claim 13 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 10, 11 and 13-15 under 35 U.S.C. §102(b) based on Shinoda are respectfully requested.

Claim 8 was rejected under 35 U.S.C. §102(b) based on Takahara *et al.* (U.S. Pub. No. 2002/0067546) (hereinafter “Takahara”). The rejection is respectfully traversed.

Claim 8 is patentable over Takahara at least because this claim recites a mirror element comprising a dielectric reflective layer and a polarizing layer to provide a predetermined polarization state of a radiation beam relative to the reflective layer so as to reflect substantially all of the radiation, the polarizing layer being integral with the dielectric reflective layer. Takahara does not teach or suggest a mirror element including these features. Therefore, Takahara does not teach or suggest each and every feature recited by claim 8 and, as a result, cannot anticipate claim 8.

Takahara discloses a polarization conversion optical system that converts light having a nonuniform plane of polarization into light having a uniform plane of polarization. Takahara discloses that the polarization conversion optical system 50 comprises a polarization beam splitter prism 51, a half-wavelength plate 52, and a mirror 53. (See FIG. 10). Takahara is, however, silent about, for example, a mirror element comprising a dielectric reflective layer and a polarizing layer to provide a predetermined polarization state of a radiation beam relative to the reflective layer so as to reflect substantially all of the radiation. As can be seen in FIG. 10, the prism 51 and the layer 51a do not substantially reflect all of the radiation. To the contrary, Takahara teaches that the incoming radiation (s+p) is partially transmitted and partially reflected by the optical system. Therefore, Takahara cannot anticipate claim 8.

Accordingly, reconsideration and withdrawal of the rejection of claim 8 under 35 U.S.C. §102(b) based on Shinoda are respectfully requested.

Claims 1-3, 5 and 6 were rejected under 35 U.S.C. §103(a) based on Shinoda in view of Totzeck *et al.* (U.S. Pub. No. 2004/0184019) (hereinafter “Totzeck ‘019”). The rejection is respectfully traversed.

As a preliminary matter, Applicants note that Totzeck ‘019 cited by the Office Action does not qualify as prior art. Specifically, Totzeck ‘019 was published on September 23, 2004, which is after the filing date of the present application, *i.e.* December 20, 2003. Therefore, Totzeck ‘019 does not qualify as prior art under 35 U.S.C. §102(a),(b) or (e) and, as a result, cannot be used in an anticipatory or obviousness type rejection.

Claim 1 recites a lithographic apparatus comprising, *inter alia*, a support structure to support a patterning device, the patterning device constructed and arranged to pattern the projection beam according to a desired pattern, and a substrate table to hold a substrate. As conceded by the Office Action, Shinoda does not teach or suggest these features. However, Applicants respectfully submit that there are additional features that are novel and non-obvious in view of Shinoda. For example, Shinoda does not teach or suggest a beam delivery system comprising redirecting elements to redirect the beam from a radiation source to an illumination system wherein the radiation source is arranged to provide a beam having a predetermined polarization state and the redirecting elements are arranged to provide a minimum polarization related radiation loss, and wherein the beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of the redirecting elements.

It is respectfully submitted that Shinoda teaches away from this feature as Shinoda discloses that the polarization state changes relative to each of the redirecting elements depending on the type of redirecting elements. (See paragraph [0047] and FIG. 1). Specifically, Shinoda teaches that it is desirable that the polarization state changes from s-type to p-type when the radiation is transmitted through a prism element. For at least this reason, Applicants respectfully submit that the subject matter of claim 1 cannot be rendered obvious by Shinoda. (See MPEP 2143).

As mentioned previously, Totzeck '019 does not qualify as prior art and therefore cannot be used to render obvious the subject matter of claim 1. However, Applicants note that the teachings of Totzeck '019 do not remedy the deficiencies of Shinoda. Therefore, claim 1 is patentable over Shinoda, Totzeck '019 and a combination thereof.

Claims 2-3 and 5-6 are patentable over Shinoda, Totzeck '019 and a combination thereof at least by virtue of their dependency from claim 1 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-3 and 5-6 under 35 U.S.C. §103(a) based on Shinoda in view of Totzeck are respectfully requested.

Claim 4 was rejected under 35 U.S.C. §103(a) based on Shinoda in view of Totzeck '019 and further in view of Takahara. The rejection is respectfully traversed.

It is respectfully submitted that Totzeck '019 is not prior art for the same reasons provided above and therefore cannot be used in an anticipatory or obviousness type rejection.

Claim 4 is patentable over Shinoda at least by virtue of its dependency from claim 1 and for the additional features recited therein.

Takahara fails to remedy the deficiencies of Shinoda. Namely, Takahara fails to teach or suggest a beam delivery system comprising redirecting elements to redirect the beam from a radiation source to an illumination system wherein the radiation source is arranged to provide a beam having a predetermined polarization state and the redirecting elements are arranged to provide a minimum polarization related radiation loss, and wherein the beam delivery system is constructed and arranged to maintain the predetermined polarization states relative to each of the redirecting elements. Therefore, any reasonable combination of Shinoda and Takahara cannot result in any way in the invention of claim 4.

Accordingly, reconsideration and withdrawal of the rejection of claim 4 under 35 U.S.C. §103(a) based on Shinoda in view of Totzeck '019 and further in view of Takahara are respectfully requested.

Claim 7 was rejected under 35 U.S.C. §103(a) based on Shinoda in view of Totzeck '019 and further in view of Kakuchi *et al.* (U.S. Pub. No. 2005/0099635) (hereinafter "Kakuchi '635"). The rejection is respectfully traversed.

Totzeck' 019 does not qualify as prior art under 35 U.S.C. §102(a),(b) or (e) for the same reasons provided above in claim 1. Furthermore, Applicants note that Kakuchi '635 has a publication date of May 12, 2005, which is after the filing date of the present application, *i.e.* December 20, 2003. Therefore, Kakuchi '635 does not qualify either as prior art under 35 U.S.C. §102(a),(b) or (e) and, as a result, cannot be used in an anticipatory or obviousness type rejection.

Claim 7 is patentable over Shinoda at least by virtue of its dependency from claim 1 and for the additional features recited therein. Namely, claim 7 is patentable over Shinoda at least because this claim recites a beam delivery system comprising redirecting elements to redirect the beam from a radiation source to an illumination system wherein the radiation source is arranged to provide a beam having a predetermined polarization state and the redirecting elements are arranged to provide a minimum polarization related radiation loss, and wherein the beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of the redirecting elements. As mentioned previously, Shinoda teaches away from these features. Therefore, claim 7 cannot be rendered obvious in view of Shinoda.

Furthermore, even assuming Totzeck' 019 and Kakuchi '635 were prior art, their teachings, taken alone or in combination, do not remedy the deficiencies of Shinoda.

Accordingly, reconsideration and withdrawal of the rejection of claim 7 under 35 U.S.C. §103(a) based on Shinoda in view of Totzeck '019 and further in view of Kakuchi '635 are respectfully requested.

Claim 9 was rejected under 35 U.S.C. §103(a) based on Takahara and Totzeck '019. The rejection is respectfully traversed.

Totzeck' 019 does not qualify as prior art under 35 U.S.C. §102(a),(b) or (e) for the same reasons provided above in claim 1.

Claim 9 is patentable over Takahara at least by virtue of its dependency from claim 8 and for the additional features recited therein. Namely, claim 9 is patentable over Takahara at least because this claim recites a mirror element comprising a dielectric reflective layer and a polarizing layer to provide a predetermined polarization state of a radiation beam relative to the reflective layer so as to reflect substantially all of the radiation, the polarizing layer being

integral with the dielectric reflective layer. Takahara teaches away from these features because Takahara teaches that portion of the incoming radiation (s+p) is partially transmitted and partially reflected by the optical system. Therefore, claim 9 cannot be rendered obvious in view of Takahara. (*See* MPEP 2143).

Furthermore, Applicants note that even if Totzeck' 019 were prior art, the teachings of Totzeck' 019 would not remedy the deficiencies of Takahara.

Accordingly, reconsideration and withdrawal of the rejection of claim 9 under 35 U.S.C. §103(a) based on Takahara and Totzeck '019 are respectfully requested.

Claims 12 and 16 were rejected under 35 U.S.C. §103(a) based on Shinoda in view of Leger (U.S. Pat. No. 5,627,847). The rejection is respectfully traversed.

Claim 12 is patentable over Shinoda at least by virtue of its dependency from claim 11 and for the additional features recited therein.

Leger fails to remedy the deficiencies of Shinoda. Namely, Leger fails to teach or suggest a device manufacturing method comprising, *inter alia*, directing the beam of radiation through a plurality of redirecting elements to an illumination system, the directing being performed such that polarization-related radiation losses are reduced and such that the predetermined polarization state relative to each of said redirecting elements is maintained. Leger merely discloses a method for making a distortion-compensating phase adjustment element for a laser. Therefore, any reasonable combination of Shinoda and Leger cannot result, in any way, in the invention of claim 12. Therefore, claim 12 cannot be rendered obvious in view of Shinoda, Leger and a combination thereof.

Claim 16 is patentable over Shinoda at least by virtue of its dependency from claim 13 and for the additional features recited therein.

Leger fails to remedy the deficiencies of Shinoda for similar reasons as provided above in claim 12. Namely, Leger fails to teach or suggest a beam delivery subsystem comprising a plurality of redirecting elements to redirect a beam of radiation having a predetermined polarization state from a radiation source to an illumination system of the lithographic apparatus, the redirecting elements being arranged to provide a minimum polarization related radiation loss, wherein the beam delivery system is constructed and arranged to maintain the predetermined polarization states relative to each of the redirecting elements. Therefore, any reasonable combination of Shinoda and Leger cannot result, in any way, in the invention of claim 16. As a result, claim 16 cannot be rendered obvious in view of Shinoda, Leger and a combination thereof.

Furthermore, Applicants respectfully submit that there is no motivation or suggestion to combine these references. The Office Action indicated that the “the ordinary artisan would have been motivated to modify Shinoda in a matter described above for at least the purpose to reduce the number of beam of reflections.” The rationale provided by the Examiner for making the suggested combination appears to be directly taken from Applicants’ disclosure. (See paragraph [0052] of the present application). However, Applicants respectfully submit that “the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.” (See MPEP 2143 citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). The Examiner is respectfully required to provide the desired motivation or suggestion or withdraw the rejection.

Accordingly, reconsideration and withdrawal of the rejection of claims 12 and 16 under 35 U.S.C. §103(a) based on Shinoda in view of Leger are respectfully requested.

Claims 17, 19 and 20 were rejected under 35 U.S.C. §103(a) based on Shinoda in view of Takahara. The rejection is respectfully traversed.

Claim 17 recites a method of manufacturing a lithographic apparatus employing radiation of a predetermined polarization state, comprising, *inter alia*, arranging a radiation system to provide a beam of radiation with the predetermined polarization state, the radiation system including dielectric mirror elements to redirect the beam from a radiation source and at least one polarizer to modify the radiation to an s-polarization state relative to the dielectric mirror elements. As conceded by the Office Action, Shinoda does not teach or suggest a polarizer including this feature. However, Applicants note that there are additional features that are novel and non-obvious over Shinoda. For example, Shinoda fails to teach or suggest a polarizer arranged between at least two of said dielectric mirror elements to modify the radiation to an s-polarization state relative to the dielectric mirror elements.

Takahara fails to remedy the deficiencies of Shinoda. Takahara merely discloses that the polarizer 52 is arranged after the beam splitter. Therefore, any reasonable combination of Shinoda and Takahara cannot result, in any way, in the invention of claim 17.

Claims 19 and 20 are patentable over Shinoda, Takahara and a combination thereof at least by virtue of their dependency from claim 17 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 17, 19 and 20 under 35 U.S.C. §103(a) based on Shinoda in view of Takahara are respectfully requested.

Claim 18 was rejected under 35 U.S.C. §103(a) based on Shinoda in view of Takahara and Leger. The rejection is respectfully traversed.

Claim 18 is patentable over Shinoda, Takahara and a combination thereof at least by virtue of its dependency from claim 17 and for the additional features recited therein.

Leger does not remedy the deficiencies of Shinoda and Takahara. Namely, Leger does not teach or suggest a method of manufacturing a lithographic apparatus employing radiation of a predetermined polarization state, comprising arranging a radiation system to provide a beam of radiation with the predetermined polarization state, the radiation system including dielectric mirror elements to redirect the beam from a radiation source and at least one polarizer arranged between at least two of the dielectric mirror elements to modify the radiation to an s-polarization state relative to the dielectric mirror elements. Therefore, any reasonable combination of Shinoda, Takahara and Leger cannot result in the invention of claim 18.

Furthermore, for similar reasons as provided above in claims 12 and 16, Applicants respectfully submit that “the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.” (*See* MPEP 2143 citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). The Examiner is respectfully requested to provide the desired motivation or suggestion or withdraw the rejection.

Accordingly, reconsideration and withdrawal of the rejection of claim 18 under 35 U.S.C. §103(a) based on Shinoda in view of Takahara and Leger are respectfully requested.

Applicants have addressed all the Examiner's rejections and objections and respectfully submit that the application is in condition for allowance. A notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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